ASHTON FISH HATCHERY

ANNUAL REPORT

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INTRODUCTION

Ashton Hatchery (Figure 1) is located in Fremont County, Idaho, approximately two miles (3.2 km) southwest of the small community of Ashton. Constructed in 1920 and funded by license dollars, Ashton Hatchery serves as a "specialty station" rearing eight species of trout and salmon, including rainbow, cutthroat, brook trout, brown trout, golden trout, grayling, kokanee, Kamloops, and Atlantic salmon.

The majority of fish produced at Ashton are fry and fingerlings (1 to 6 inches) that are distributed throughout Idaho as part of various put-grow-and-take management programs. Catchable-size (9 to 10 inches) trout are also reared at Ashton and distributed locally in waters managed on a put-and-take basis.

FISH PRODUCTION

General Overview

A total of 1,277,443 fish (29,679 pounds) were produced at Ashton Hatchery this year, consisting of 1,228,389 fingerlings (9,590 pounds) and 49,054 catchables (20,089 pounds). The total number of fish produced (Table 1) was down slightly from last year, but the majority of fish requests were met or exceeded. Production costs (excluding capital outlay) totaled $139,200, with $12,510.35 spent on fish feed and the remaining $126,689.65 spent on general hatchery operations and personnel costs. Average cost per pound of fish produced was $4.69 (Table 1).

All of the fish reared at Ashton (except kokanee) were received as eyed eggs from other hatcheries (Table 2). Kokanee were spawned at Moose Creek in 1990 and the green eggs transferred back to Ashton for incubation and rearing. Ashton produced enough rainbow catchables to meet hatchery production goals, but not enough to fulfill all regional stocking requests, so catchables were shipped in from American Falls and Mackay for redistribution by Ashton personnel (Table 3).

All fry and fingerlings were fed by automatic belt feeders that dribbled feed into the raceways 8 to 12 hours per day. Human disturbance was thereby minimized, and feed conversions improved with belt feeders versus the hand feeding technique.

Only catchables were hand-fed, and next year demand feeders will be used on these fish. Waste-settling areas were created in the back 15% of the smaller outside raceways and served to settle out fish waste for removal before it floated back through the lower fish. Lights over the nursery vats were set at a moderate intensity, and growth rates maintained when the fish were moved outside by the use of automatic fry feeders and covers on the small raceways.

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Grayling had the lowest monthly length increase of all species reared (Table 4), while goldens had the poorest conversion rate and were the most difficult to culture. Catchable rainbows had the highest mean monthly length increase. A low cutthroat growth rate could have been partially attributed to an outbreak of coldwater disease.

Average survival for all fish was 82% from eyed eggs to planting. Goldens had the lowest survival (39%) because of coldwater disease, while brown trout had the highest with 95% (Table 4). Kokanee, Kamloops, and cutthroat also had good survival, and grayling survival tripled from last year.

Catchable Rainbows

Ashton Hatchery personnel produced 49,054 (20,089 pounds) 10.5-inch rainbow trout for distribution in area lakes and rivers (Table 1). Water flows were down from 5.5 cfs normally to 4.5 cfs during the spring months of heavy production. Catchables were held off feed for two-week intervals in an effort to slow growth and conserve available oxygen until they could be thinned out. Consequently, supplemental oxygen had to be injected to keep these fish alive. An oxygen injection box was built that mounts behind the raceway dam boards and produces oxygen transfer efficiencies over 80%. Pure oxygen was injected into the box and resulting dissolved oxygen levels were raised 1 to 5 ppm, depending on how much oxygen was injected. Later, a similar box was purchased from Ziegler Brothers for future use.

Golden Trout

Golden trout are being reared at Ashton Hatchery primarily in an attempt to establish an Idaho spawning population at Baker Lake, and also for stocking several mountain lakes. A total of 580, 5.5-inch fish from the 1990 brood year were planted in Baker Lake in early July. These fish had visual signs of coldwater disease and were treated with terramycin, oxalinic acid, and biomycin in an effort to stop the disease. Oxalinic acid worked well for three weeks after the treatment, then mortalities started again. The constant care of these fish is one of the reasons they were the most expensive to rear (Table 1). The mean monthly length increase for these fish was 0.34 inches, while the average conversion was 2.13:1. The poor conversion resulted from overfeeding a relatively small amount of fish.

A total of 1,057 eyed eggs were received from Sylvan Lake, Montana in early July, and about 700 are on hand for stocking in Baker Lake during the summer of 1992. These fish have had five terramycin treatments in the first eight months of culture, and a lower mortality rate has been observed so far compared to last year, but we are still experiencing mortalities.

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Grayling

Grayling experienced the highest survival (59%) of the last several years. Eggs arrived unpicked and started hatching within a few days. Pantyhose were placed over the tailscreen to keep grayling from slipping through the tailscreen holes. The pantyhose have plugged with fish waste in previous years, so this year, a primitive water level alarm was devised using a styrofoam float, car horn, and a 12-volt battery. As the tailscreen plugged and raised the water level in the vat, the alarm was activated, alerting personnel of the problem.

The mean monthly length increase was .19 inches, while the conversion was 1.23:1. Kindschi and Barrows (1989) reported that grayling fed BioKyowa during the first 14 days of their test had a survival rate of 81%. Grayling were fed BioKyowa B-400 fry feed for the first three weeks at Ashton, then switched to Bio-diet semi-moist starter feed. This diet combination, although expensive, has been very effective in increasing grayling survival at Ashton the last two years, and will be continued again next year.

HATCHERY IMPROVEMENTS

Hatchery improvements included the purchase of a new GMC 2-ton truck for fish transport. The truck was equipped with warning gauges for oxygen and aerators, an AM/FM radio, and is a big improvement over the old truck. A low-head oxygen (LHO) injection box was purchased for periods of high fish production, and a new oven, range hood, and three window panes were purchased for residence two. A new phone answering machine was purchased, and four truckloads of gravel were hauled in to repair hatchery roads.

A new drain line was laid to drain surface water from the back yard of residence one. The quonset hut front doors and Lord's property fence were repaired. An oxygen injection box was designed and built, and the back side of residence two and the three-car garage were repainted. The white property fence was repainted and the hatchery sign was stripped and revarnished. The irrigation line was dug up and repaired, and willows were cut down over the springs. The carpets in both residences and the office were professionally cleaned.

Future needs include hatchery renovations to enable hatchery personnel to produce an additional 22,000 catchables for Ashton Reservoir. Utah Power is providing $110,000.00 for these renovations, which include repairing the west raceway wall, installing an aeration cleaning system and waste settling area screens, equipping existing drain lines with PVC standpipes, installing a liquid oxygen bulk tank and plumbing to all raceway sections, and purchasing eight LHO oxygen boxes and an oxygen monitoring system.

Additional needs should include repairing the outlet structure, building an extension onto the hatchery building, repairing the entrance road, pouring a concrete pad on the west side of the quonset hut for loading the small stocking

tank, and building a large storage area and heated garage east of the quonset hut. A new fish pump, fireplace for residence one, and an updated computer should also be purchased.

FISH HEALTH

Department personnel from the Eagle Fish Health Laboratory conducted fish health inspections throughout the year (Table 5). Fish were tested for viral, bacterial, and protozoan pathogens, but none were diagnosed. Cutthroat and golden trout had visual signs of bacterial coldwater disease, but coldwater bacteria were not recovered in the sample culture. The goldens were treated with Chloramine T to relieve gill disease problems, and then later treated with terramycin. Mortalities continued so their feed was top dressed with oxalinic acid. Mortalities dropped off for three weeks immediately after treatment, then started increasing again. Prior to stocking, 420 goldens received an injection of Biomycin.

Cutthroat were treated for bacterial gill disease with Chloramine T in August prior to their release. They also showed signs of coldwater disease, and although mortalities were low, the disease may have slowed their average growth.

Kokanee and Kamloops were also treated with Chloramine T for bacterial gill disease with good results. About 60,000 rainbow fingerlings were treated with formalin at a 1:9,000 concentration for a bad case of gyrodactylus parasites. The one-hour bath treatment worked well and removed the parasites from the fish.

Kokanee adults from Moose Creek were not sampled this year since no eggs were obtained from these fish. However, BKD was detected by ELISA in adult kokanee from Deadwood Reservoir. Some eggs from these adults were shipped to Ashton for rearing, and should probably be checked for BKD before being stocked.

Ashton personnel recommend that brook trout, kokanee, and goldens have thorough disease workups in the spring of 1992. If virus, Ich, or BKD are present in high concentrations, these fish could be discarded or effectively isolated. Also, golden trout should be fed prophylactic treatments of terramycin every one or two months to slow or prevent the onslaught of coldwater bacteria.

FISH STOCKED AND TRANSFERRED

Ashton Hatchery's stocking program remained similar to last year's program, with only **a** few minor changes. Atlantic salmon were not reared this year, and Hayspur rainbow eggs were received instead of Arlee eggs from Montana (Table 2). Hayspur strain rainbow trout have been requested for planting as mitigation for Utah Power's Ashton Dam and Power Plant on the Henrys Fork. During the summer of 1993, 22,000 Hayspur catchables will be stocked into Ashton Reservoir by Ashton personnel.

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Temiscamie and natural brook trout from Henrys Lake have been combined into one strain (Henrys Lake brook trout) because the Temiscamie strain were not performing in the fishery as originally expected. The Teton River cutthroat stocking program from Ashton was eliminated. Consequently, no fin clipping or tag studies were conducted this year on these fish.

FISH SPAWNING

For the fifth consecutive year, Ashton Hatchery personnel operated a kokanee trap on Moose Creek, a tributary to the North (Henrys) Fork Snake River. The trap was located downstream from Big Springs Road, approximately four miles from Mack's Inn.

Trapping began on August 12 and continued until August 29 (Figure 2). Only 59 kokanee were trapped this year, compared to 165 last year and 341 the year before. Because of the lack of adult kokanee in the run, no adults were spawned and the trap was pulled out on August 29. All adult kokanee were then allowed to continue upstream to spawn naturally in Moose Creek. Prior to August 29, ripe females and males were released upstream to spawn as they came into the trap. Two males and one female were transported to the state fair, and the trap tender was sent to Deadwood Reservoir to assist in the kokanee spawning effort there.

On October 4, 408,366 eyed Deadwood kokanee eggs were received from Mackay Hatchery. A total of 300,000 fish will be stocked into Moose Creek and Island Park Reservoir, and the remainder will be stocked into Ririe Reservoir. Other spawning activities included helping sort and spawn hybrids, cutthroat, and brook trout at Henrys Lake.

FISH FEED

A total of 35,967 pounds of feed were used to produce 29,679 pounds of gain, for an average conversion of 1.21:1 (Table 6). All fish, with the exception of grayling, were initially fed Bio-Diet because of the size uniformity and performance of the feed. When fish reached 500/lb, they were switched to a lower cost Rangen's soft-moist feed. Swim-up grayling were started on Bio-Kyowa B-400 fry feed because of their small size, and then switched to Bio-Diet after several weeks. Catchables and holdover rainbows were switched to a less expensive Rangen's dry diet when they were five inches long, while all other species remained on soft-moist feed until they were planted.

PUBLIC RELATIONS

Approximately 3,000 people visited the hatchery during the year. Over 950 elementary school students from as far as Idaho Falls received hatchery tours last spring, and several tours were given during the summer and fall. Hatchery

tours for elementary students have quadrupled in the last three years. Our visitor information display answers questions about the hatchery, fishing and hunting regulations, and various Idaho Department of Fish and Game policies. The 2-ton fish truck was used in the Ashton Fourth of July parade to represent the hatchery in the community.

Ashton Hatchery personnel attended a "check presentation" ceremony at Ashton Dam in which Utah Power Company officials presented a check for $110,000.00 to hatchery personnel for renovations to increase production so Ashton Reservoir could be stocked with the hatchery's fish. Channel 8 television and newspaper reporters were there to record the events, and a television interview followed at the hatchery.

Ashton Junior High School conducted an environmental awareness workshop in which hatchery personnel presented information about the hatchery and the Henrys Lake fish kill, and also discussed other IDFG activities. Two favorable articles about the hatchery were written in the Idaho Falls Post Register and the Ashton Fall River Review. These articles covered fish produced, stocking locations, and hatchery programs.

Fishing was again allowed in the hatchery settling pond for kids age 12 and under on Free Fishing Day. The Forest Service provided signs and refreshments, while four Forest Service personnel assisted hatchery personnel in showing the kids how to fish. Region 6 (IDFG) fishery personnel provided bait, hooks, bobbers, and fishing poles for the event. Joe Curry, Ashton DCO, gave a talk on fishing ethics and laws, and Ralph Moon, world renowned fly fisherman, gave lessons on flyfishing and flytying. Another forester was available for camping instructions and tips, and over 200 kids took advantage of the free fishing. Nearly all (99%) of the kids caught a fish, and the average fish caught was 2 pounds, with three 4-pound brown trout taken.

FIN CONDITION

Ashton Hatchery personnel devised a qualitative way to measure hatchery fish fin condition. The technique, "The Ashton Method," compares pectoral and dorsal fin lengths of hatchery fish with those of wild fish to get a percent figure, or fish fin factor. The higher the fin factor, the better the fish fins.

The fin standard for wild fish between 8 inches and 14 inches taken from the Henrys Fork near Ashton is .13 (.13 inches fin length per inch of fork length) (Figure 3). The projected fin length is the length wild fish fins should be if a fin standard of .13 is used to calculate fin length (Figure 4). For example, a 12.8-inch wild fish should have an average fin length (each fin) of 1.66 inches (12.8 inches x .13). The actual average fin length at each fish length is also shown in Figure 4.

To use the Ashton method, anesthetize 20 fish and measure the fork length, pectoral fins, and dorsal fin of each fish. These measurements are plugged into a computer program that compares the measurements with those of wild fish (Table

7) and calculates the fin factor. At least five 20-fish samples should be taken prior to stocking, and the average fin factor used as the index of fin condition.

The fin factor at Ashton Hatchery for this year was 69, or hatchery fish fins were 69% of wild fish fins. Montana Arlee rainbows had a fin factor of 60 (Table 8), while Wyoming rainbows had a fin factor of 78 (Table 9), so the average fin factor was 69. Fin measurements for Ashton Hatchery fish averaged .0897 inches of fin per inch of fork length, compared to .13 for wild fish (.0897=69% x.13). Since this was a new method, only two 20-fish samples were taken. Wild rainbow trout (8 inches to 14 inches) from the Henrys Fork were used for the wild fish fin index, so "the Ashton Method" works best with 8- to 14-inch hatchery rainbows until fin data from other wild fish species can be collected.

SPECIAL PROJECTS

Henrys Lake Fish Kill

Ashton Hatchery personnel provided over 150 hours of assistance to Henrys Lake personnel during the spring fish kill at the lake. Low dissolved oxygen in the water from excessive plant decomposition and the lack of incoming water from Henrys Lake tributaries caused an extensive fish kill in which over 8,000 dead cutthroat, hybrids, and brook trout were removed from the lake. Over 20 aerators were placed at strategic locations around the lake to provide additional oxygen in the water, and oxygen was monitored constantly.

Hooking Mortality Study

A hooking mortality study is being conducted around the state by fishery biologists to assess the impact of different fishing methods on fish mortality. On Free Fishing Day, Ashton Hatchery personnel collected more hooking data than Regions 4, 5, and 6 combined.

Fish Marking

All golden trout destined for Baker Lake had their adipose fin clipped for easy identification when they return to the fish trap. No other fish were marked or tagged this year. Temiscamie brook trout and cutthroat were not fin clipped this year because of hatchery program changes.

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Broodstock Hauling

Ashton Hatchery personnel were involved in the mid-winter transport of large rainbow trout broodstock culls from Ennis, Montana. Ennis National Fish Hatchery is primarily an egg-taking facility, and excess spawners were hauled to lakes and rivers in Idaho. The majority of these fish were between 5 and 15 pounds, and 979 fish (8,115 pounds) were transported to Regions 6 and 7 by Ashton personnel. Newspaper and radio coverage was very favorable, and several ice fisheries were created. In addition, hatchery personnel hauled 9,364 catchables (1,757 pounds) from Ennis to lakes in Region 6.

Regional Efforts

Hatchery personnel assisted the region on Memorial weekend by checking fishing licenses of fishermen on the Henrys Fork. Personnel also assisted with the Ashton elk check station for two days, and hauled water to the Sand Creek Wildlife Management Area for a new elk watering tank. Hatchery personnel also helped electrofish the Henrys Fork near Ashton and organized the hatchery manager's meeting at Harriman State Park.

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ACKNOWLEDGEMENTS

Ashton Hatchery personnel wish to thank Rick Lowell and the crew at Deadwood Reservoir for taking the kokanee eggs that were shipped to Ashton. Special thanks to the personnel from various hatcheries that helped minimize the fish kill at Henrys Lake.

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LITERATURE CITED

Kindschi, Greg A. and Frederick T. Barrows. 1989. Diets for the Intensive Production of Montana Arctic Grayling. U.S. Fish and Wildlife Service, Bozeman Fish Technology Center, 4050 Bridger Canyon Road, Bozeman, Montana 59715.

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Table 1. Fish production and costs.

Species	Size	No. fish	Weight	Cost/lb.	Cost/fish	Total cost
fingerling						
RA	3.3	225,295	2,012	$ 10.02	$0.09	$20,156.16
K1	2.4	132,564	594	4.92	0.02	2,923.20
BN	2.8	105,705	1,090	6.32	0.06	6,890.40
BK	3.5	141,358	2,097	11.28	0.16	23,664.00
KE	3.1	260,405	2,656	12.10	0.12	32,155.20
C3	2.5	320,824	1,116	2.87	0.01	3,201.60
GR	1.4	41,658	9.7	189.43	0.04	1,837.44
GN	5.5	580	15.5	246.97	6.60	3,828.00
totals		1,228,389	9,590.2	$ 9.87	$0.07	$94,656.00
catchables						
RA	10.5	49,054	20,089	$ 2.22	$0.91	$44,544.00
totals		1,277,443	29,679.2	$4.69	$0.11	$139,200.00

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Table 2. Eggs and fish received and transferred during 1991.

Species	Eggs received	Fish received	Eggs transferred	Fish transferred	To:
C3	362,500				
RC	804,430		586,364		Hagerman
GR	70,400			10,160	Mackay
				25,000	McCall
				3,998	Clark Fork
GN	1,057			580	Hayspur
R5		5,250			
R9		6,030			
KE	408,366				
R9	306,329				
K1	155,040				
BK	215,900				
BN	147,914				
AS	11,532				
	2,483,468	11,280	586,364	39,738	

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Table 3. Origin of fish stocked or transferred 1991.

Species	Source	Eggs	Fish	Destination	Stocked	Trans-ferred	Size
RA	Ennis NFH	357,851*		Region 6	225,295**		3.3
K1	Gloyd Springs	148,779*		Ririe	132,564		2.4
BN	Saratoga	111,184*		Region 6	105,705		2.8
BK	Henrys Lake	197,256*		Regions 5/6	141,358		3.5
KE	Deadwood	307,236*		Island Park	260,405		3.1
C3	Henrys Lake	362,500		Teton	320,824		2.5
C3	Henrys Lake		140,000	Henrys Lake	140,000		1.0
RC	Henrys Lake	804,430		Hagerman		586,364	eggs
GR	Sylvan Lake	70,400		Mtn. Lakes	2,500	39,158	1.4
GN	Sylvan Lake	1,475*		Baker Lake		580	5.5
R5	Mackay		5,250	Region 6	5,250		9.5
R9	Am. Falls		6,030	Region 6	6,030		9.5
RA	holdovers*		64,446	Region 6	49,054		10.5
	total stocked or transferred				1,388,985	626,012	

* Received prior to 1991.
** An additional 60,000 still on hand.

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Table 4. Comparative growth rates, feed conversion and percent survival for all species reared at Ashton Hatchery, 1991.

Species	Average monthly length increase	Average conversion	Percent survival
rainbow (catch.)	0.50	1.0	76%
rainbow (fing.)	0.45	0.75	81%
golden	0.34	2.13	39%
brook	0.41	0.64	72%
brown	0.39	0.82	95%
Kamloops	0.40	0.79	89%
grayling	0.19	1.23	59%
kokanee	0.36	0.90	85%
cutthroat	0.27	1.14	89%

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Table 5. Pathology test results, Ashton Hatchery, 1991.
Legend:

Species/strain	Sample date (91)	VH	VP	VE	BK	BF	BR	BC	PX	PW	PC	PI
Golden trout (Wyoming)	2-20	-	-	-		-	-	-				
Brook trout (Henrys Lake)	3-6	-	-									
Brown trout (Wyoming)	4-4	-	-	-		-	-	-				
Cutthroat trout (SF Sn R)	7-3	-	-		-							

VH = IHNV, infectious hematopoietic necrosis virus
VP = IPNV, infectious pancreatic necrosis virus
VE = EIBS, erythrocytic inclusion body syndrome virus
BK = bacterial kidney disease agent, Renibacterium salmoninarum
BR = enteric redmouth bacterium, Yersinia ruckeri
BC = bacterial coldwater disease, Cytophaga psychrophila or Flexibacter
BF = bacterial furunculosis, Aeromonas salmonicida
PW = whirling disease agent, Myxobolus (Myxosoma) cerebralis
PX = PKX, agent of PKD, proliferative kidney disease PC = Ceratomyxa shasta, agent of ceratomyxosis PI = infestation by Ichthyophthirius multifilis

+ = Positive results =
Negative results

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Table 6. Feed use.

Size	Source	Pounds	Cost/lb.	Total Cost
1/32 SM	Rangens	803	0.6550	525.96
3/64 SM	Rangens	1,980	0.6250	1,237.50
1/16 SM	Rangens	3,025	0.5900	1,784.75
3/32 SM	Rangens	1,980	0.5600	1,108.80
3/32 dry	Rangens	2,500	0.2175	543.75
1/8 dry	Rangens	9,000	0.2175	1,957.50
5/32 dry	Rangens	6,250	0.2175	1,359.37
#1	Bio-products	220	0.8630	189.86
#2	Bio-products	484	0.8630	417.69
#3	Bio-products	528	0.8630	455.66
1.0 mm	Bio-products	880	0.6800	598.40
1.3 mm	Bio-products	616	0.6590	405.94
1.5 mm	Bio-products	528	0.6400	337.92
#2 medic.	Bio-products	44	1.2560	55.26
1.3 medic.	Bio-products	44	0.9510	41.84
B-400	Bio-Kyowa	2.2	33.6400	74.00
TOTALS		28,884.2		$11,094.20
		7,082.8*		1,416.15*
		35,967		$12,510.35

* feed purchased 1990 and fed out 1991

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Table 7. Fin lengths of wild fish from Henrys Fork, April 30, 1991.

Fork length (in)	Fork length (mm)	Raw data			Average fins	Fin standard per length	(proj.) length *.1286
		Right pectoral	Left pectoral	Dorsal			
7.6	193.0	25.4	25.4	25.4	25.4	0.132	0.977
10.0	253.0	28.6	31.8	31.8	30.7	0.121	1.281
10.1	256.4	31.8	31.8	31.8	31.8	0.124	1.298
10.9	276.9	44.5	38.1	41.3	41.3	0.149	1.402
11.4	289.6	38.1	38.1	34.9	37.0	0.128	1.466
11.4	289.6	34.9	38.1	38.1	37.0	0.128	1.466
11.4	289.6	38.1	38.1	31.8	36.0	0.124	1.466
11.9	302.3	31.8	31.8	31.8	31.8	0.105	1.531
11.9	302.3	38.1	38.1	31.8	36.0	0.119	1.531
12.6	320.0	41.3	41.3	38.1	40.2	0.126	1.620
12.8	325.1	44.5	44.5	38.1	42.3	0.130	1.646
13.8	350.5	44.5	44.5	44.5	44.5	0.127	1.775
14.0	355.6	50.8	47.6	44.5	47.6	0.134	1.800
15.0	381.0	54.0	57.2	47.6	52.9	0.139	1.929
15.7	398.8	57.2	54.0	54.0	55.0	0.138	2.019
Average	305.6	40.2	40.0	37.7	39.3	0.128	

.129 Fin length/inch of fish length

Pro. fin length average = 39.299 = (Average fin length of all 3 fins)

Fin length/inch of fish = 0.1286 = average fin length (39.29)/average fish length

(.13) = wild fish number (321.5)

Wild fish fin standard = .13 (Average of all lengths)

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Table 8. Fin lengths of hatchery fish, April 20, 1991.
Pond: Arlee rainbow.

Fork length (in)	Fork length (mm)	Raw data			Average fin length
		Right pectoral	Left pectoral	Dorsal	
8.7	220.1	12.7	15.7	19.1	15.8
9.0	229.2	19.1	19.1	22.1	20.1
9.3	235.3	9.4	12.7	22.1	14.7
9.3	235.3	15.7	19.1	25.4	20.1
9.3	235.3	22.1	22.1	25.4	23.2
9.5	241.3	19.1	15.7	22.1	19.0
9.7	247.3	19.1	22.1	22.1	21.1
9.7	247.3	12.7	6.4	19.1	12.7
9.7	247.3	19.3	19.1	19.1	19.1
10.0	253.4	22.1	22.1	25.4	23.2
10.2	259.4	19.1	19.1	22.1	20.1
10.2	259.4	3.0	12.7	22.1	12.6
10.3	262.3	15.7	15.7	25.4	19.0
10.3	262.3	25.4	25.4	25.4	25.4
10.5	265.4	22.1	22.1	26.9	23.7
10.5	265.4	15.7	15.7	25.4	19.0
10.5	265.4	19.1	15.7	19.1	17.9
10.5	265.4	22.1	19.1	25.4	22.2
10.6	268.3	22.1	22.1	28.4	24.2
10.6	268.3	19.1	19.1	22.1	20.1
Average	251.7	17.7	18.0	23.2	19.7

Fin length average = 19.7 = (average fin length of all 3 fins)

mm fin length/mm fish length = 0.078 = average fin length 19.7/average fish length 251.7

hatchery number = 0.078
wild fish number = 0.13

hatchery to wild fish fin percent = 0.60

or, your hatchery fish fins are 60% of wild fish fins

your fish fin factor = 60

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Table 9. Fin lengths of hatchery fish, April 20, 1991.
Pond: KCR rainbow.

Fork length (in)	Fork length (mm)	Raw data			Average fin length
		Right pectoral	Left pectoral	Dorsal	
6.4	162.9	12.7	15.7	19.1	15.8
6.4	162.9	19.1	19.1	15.7	17.9
6.8	171.8	19.1	19.1	19.1	19.1
7.4	187.0	22.1	22.1	22.1	22.1
7.8	199.1	19.1	22.1	22.1	21.1
8.1	205.1	22.1	22.1	25.4	23.2
8.1	205.1	19.1	15.7	22.1	19.0
8.6	217.2	19.1	19.1	22.1	20.1
8.6	217.2	25.4	25.4	25.4	25.4
8.7	220.1	19.1	22.1	22.1	21.1
8.8	223.2	19.1	22.1	25.4	22.2
8.8	223.2	22.1	19.1	25.4	22.2
9.0	229.2	22.1	25.4	25.4	24.3
9.3	235.3	22.1	25.4	25.4	24.3
9.4	238.2	25.4	25.4	22.1	24.3
9.5	241.3	22.1	22.1	28.4	24.2
9.5	241.3	19.1	22.1	25.4	22.2
9.7	247.3	22.1	22.1	25.4	23.2
10.0	253.4	25.4	25.4	22.1	24.3
10.9	277.5	25.4	25.4	28.4	26.4
Average	217.9	21.1	21.8	23.4	22.1

Fin length average = 22.1 = (average fin length of all 3 fins)

mm fin length/mm fish length = 0.101 = average fin length 22.1/average fish length 217.9

hatchery number = 0.101
wild fish number = 0.13

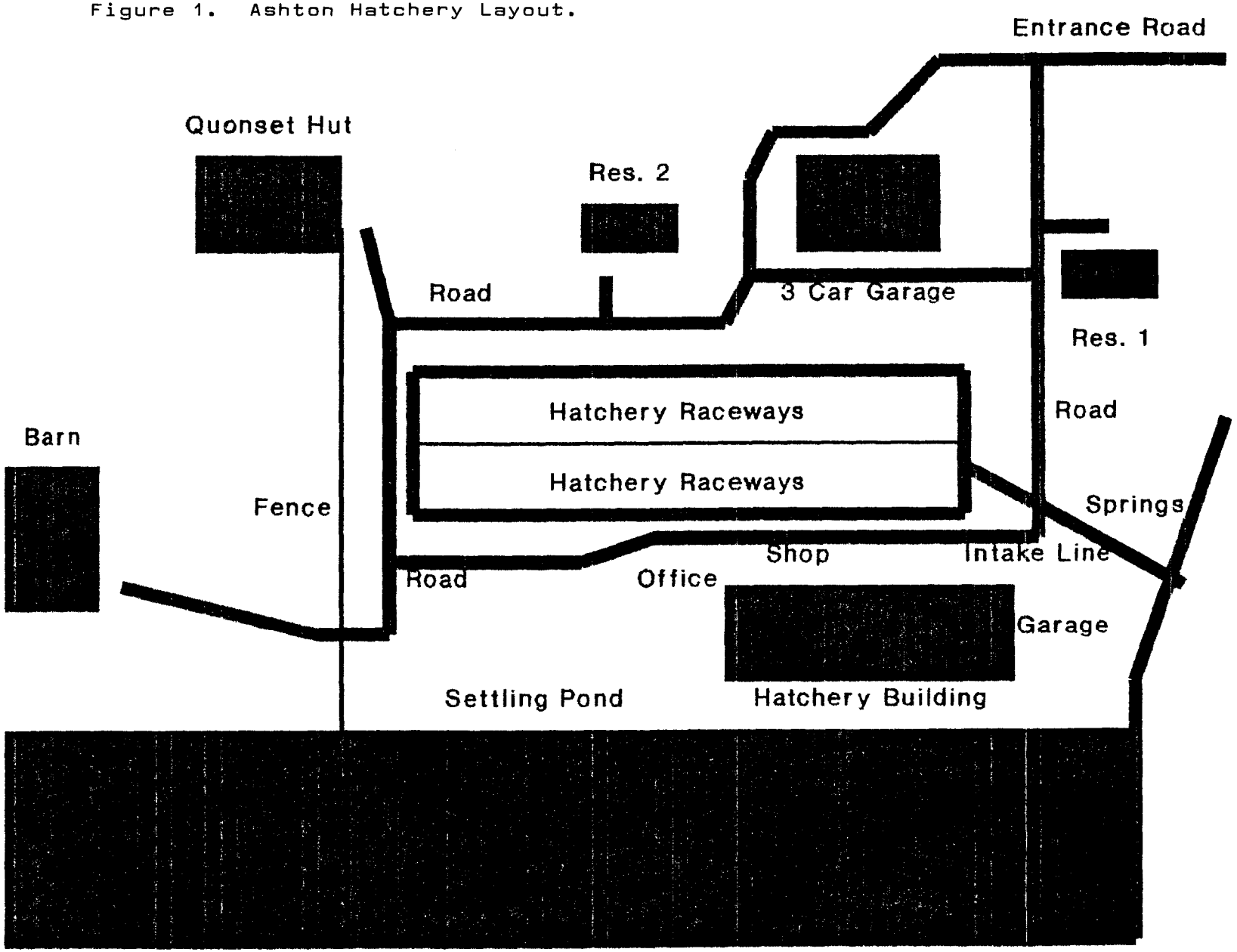
hatchery to wild fish fin percent = 0.78

or, your hatchery fish fins are 78% of wild fish fins

your fish fin factor = 78

ASHTABS

Figure 1. Ashton Hatchery Layout.



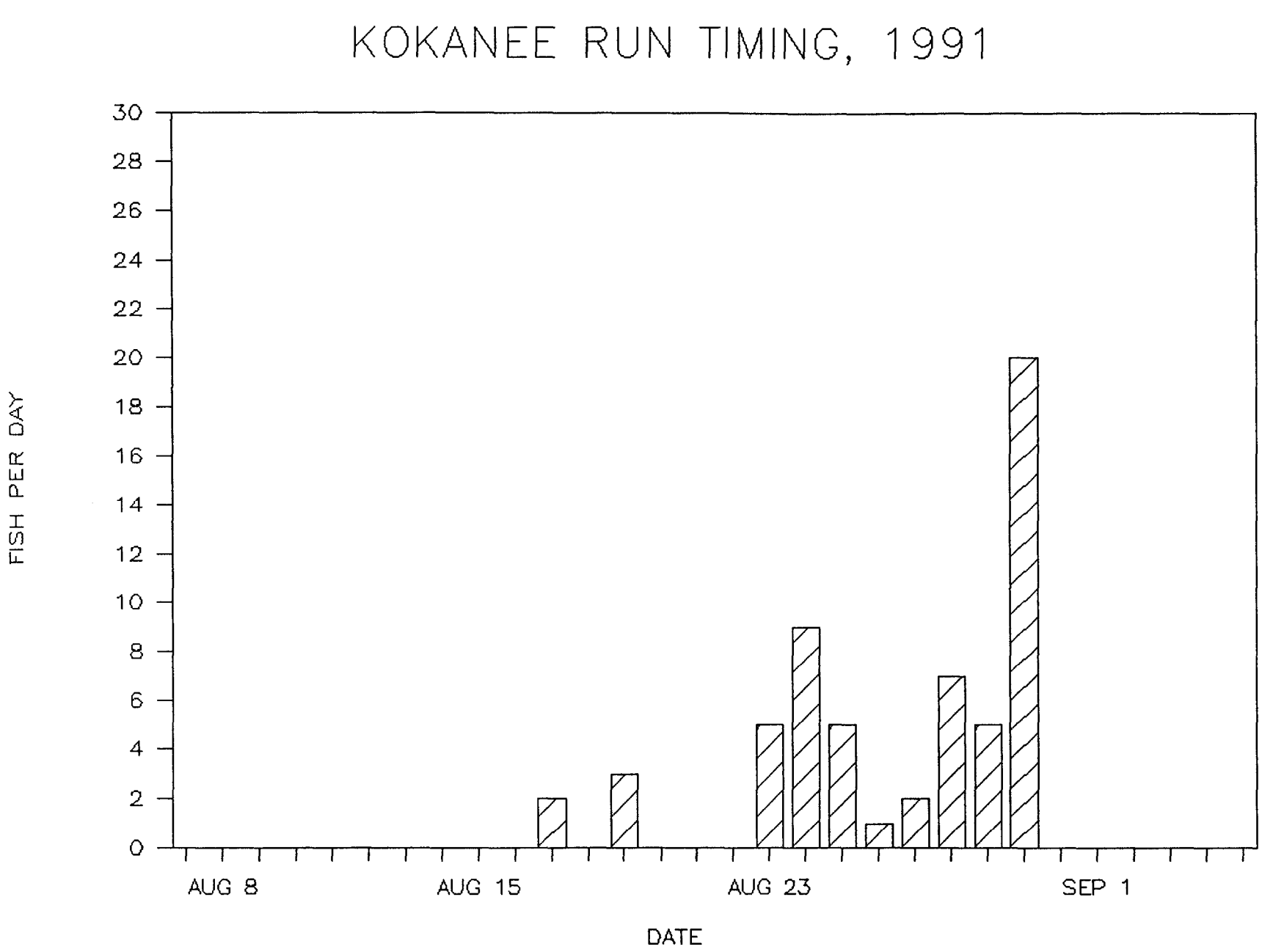


Figure 2. Kokanee trapped at Moose Creek, Island Park Reservoir.

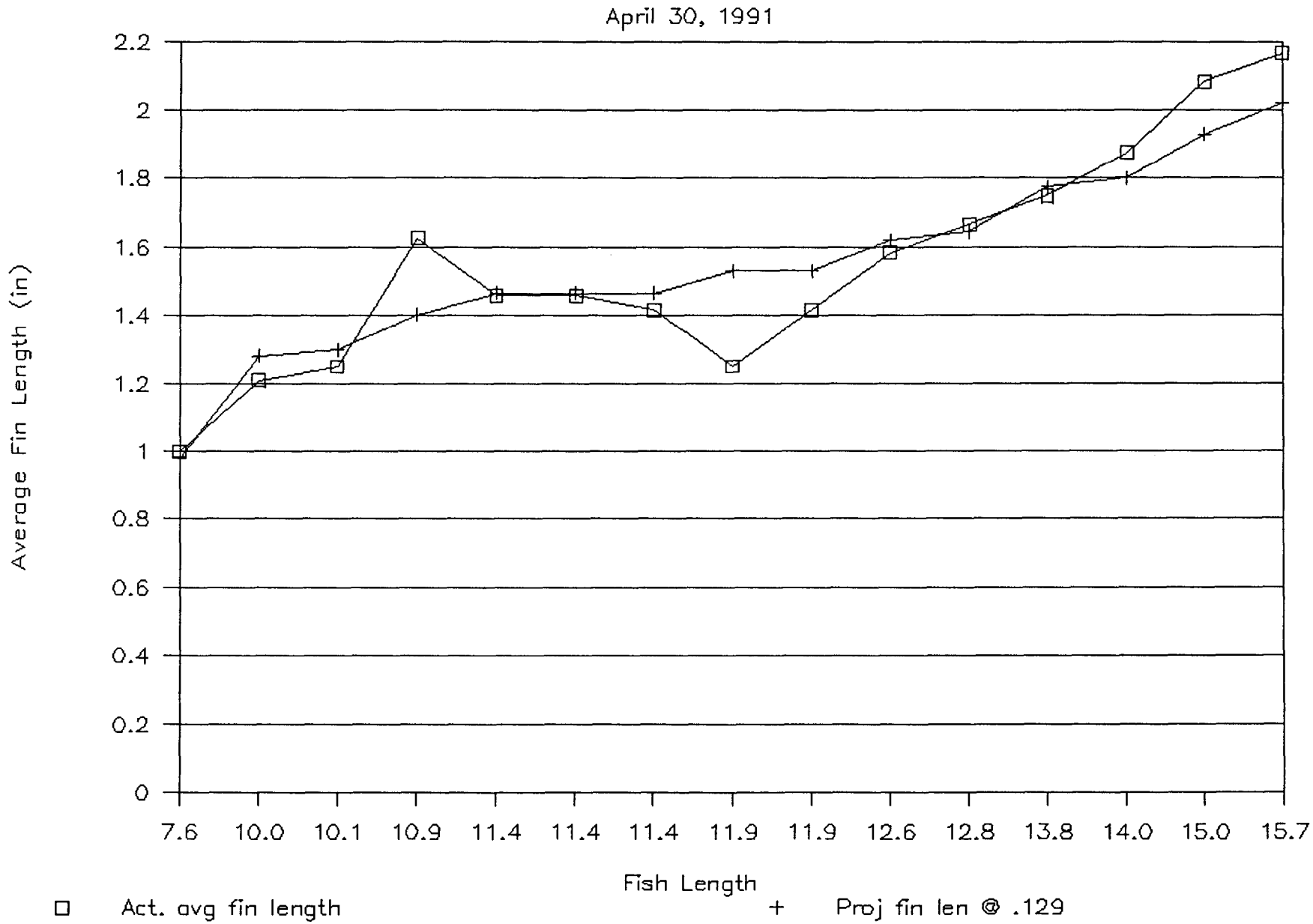


Figure 3. Fin standards of wild fish from the Henrys Fork.

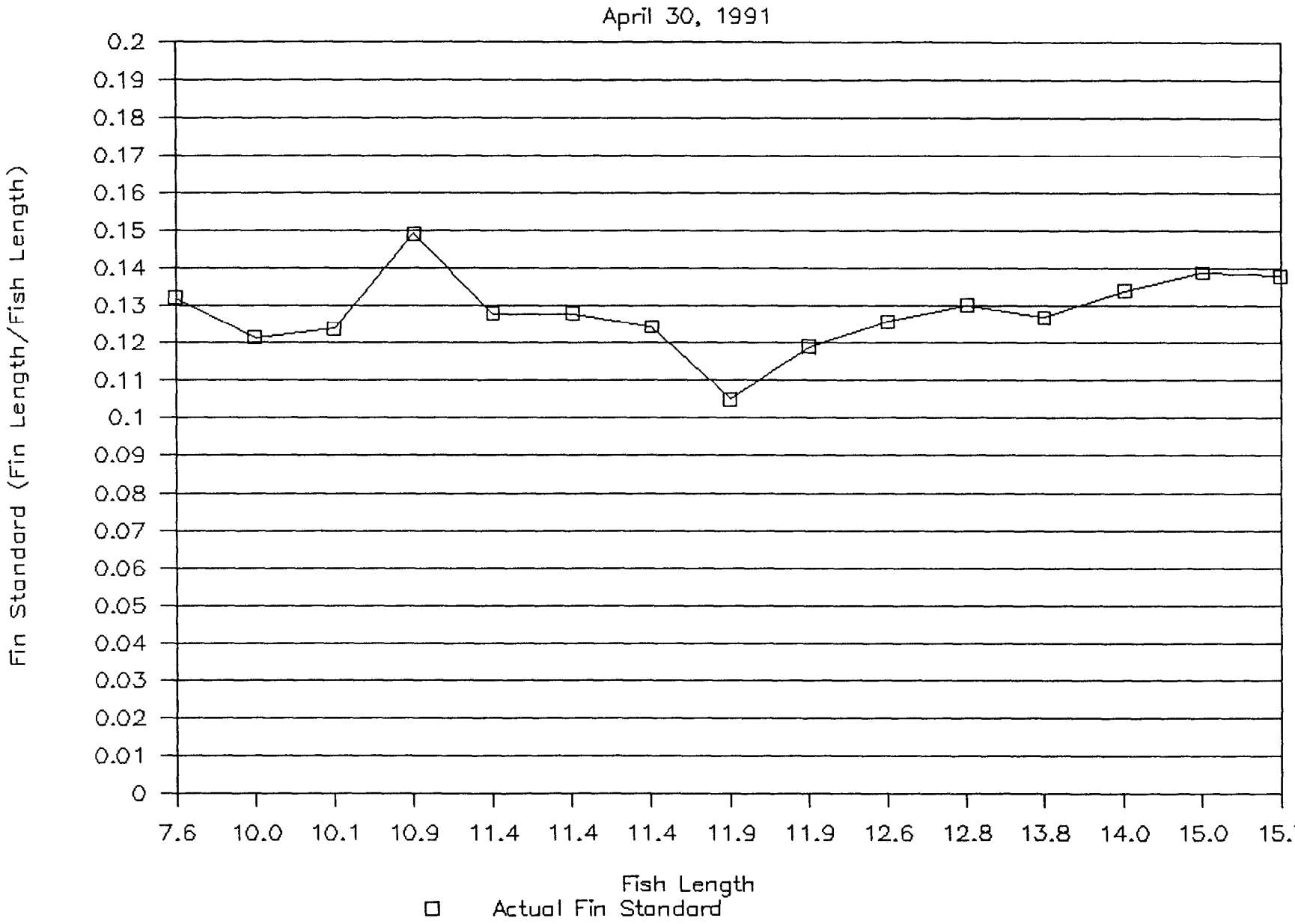


Figure 4. Fin lengths of wild fish from the Henrys Fork.